CLAIMS

What is claimed is:

1. A paper-feeding apparatus of an image forming apparatus having first and second drive roller shafts, and a paper cassette, the paper-feeding apparatus comprising:

a first drive roller, rotatably disposed on the first drive roller shaft;

a pickup roller assembly, rotatably disposed, at a first end thereof, on the first drive roller shaft;

a pickup roller, rotatably disposed at a second end of the pickup roller assembly to selectively move a sheet of paper in the paper cassette in a first direction, the pickup roller being disposed in a second direction, opposite the first direction, with respect to the first drive roller;

a second drive roller, rotatably disposed on the second drive roller shaft, to press the sheet of paper with a first predetermined pressure against the first drive roller; and

a drive roller power transmitter transmitting a driving force to the first and second drive rollers and the pickup roller during a paper pickup mode, and transmitting the driving force only to the first and second drive rollers during a line feeding mode.

2. The paper-feeding apparatus according to claim 1, wherein the paper-feeding apparatus further comprises:

a rotatable feed roller part transmitting the driving force to the drive roller power transmitter; and

a driving motor transmitting the driving force to the feed roller part.

3. The paper-feeding apparatus according to claim 2, wherein:

the feed roller part comprises

a feed roller, and

a feed roller gear, fixedly positioned coaxially with the feed roller; and

the paper-feeding apparatus further comprises at least one power transmitting gear transmitting the driving force from the driving motor to the feed roller gear.

4. The paper-feeding apparatus according to claim 2, wherein the drive roller power transmitter comprises:

a swing gear part transmitting the driving force from the feed roller part to one of the first drive roller and the second drive roller, according to a rotational direction of the feed roller part,

wherein the feed roller part rotates in a first rotational direction during the paper pickup mode, and rotates in a second rotational direction opposite the first rotational direction during the line feeding mode.

5. The paper-feeding apparatus according to claim 4, wherein:

the paper-feeding apparatus further comprises

a first drive roller gear fixedly positioned coaxially with the first drive roller, and

a second drive roller gear fixedly positioned coaxially with the second drive roller; and

the swing gear part comprises

a first idle swing gear engaging the first drive roller gear;

a second idle swing gear engaging the second drive roller gear;

at least one swing gear engaging the feed roller part, and selectively engaging one of the first and the second idle swing gears according to the rotating direction of the feed roller part.

6. The paper-feeding apparatus according to claim 5, wherein the swing gear part further comprises:

at least one swing gear shaft, on which the at least one swing gear is rotatably disposed; and

a swing lever, rotatably connected at a first end thereof to the at least one swing gear shaft, and hingedly connected at a second end thereof to a frame, movable, so that the swing gear selectively engages one of the first and the second idle swing gears according to the rotating direction of the feed roller part.

7. The paper-feeding apparatus according to claim 5, wherein:

during the paper pickup mode,

the first idle swing gear engages and transmits the driving force to the first drive roller gear, and

the first drive roller transmits the driving force to the second drive roller; and

during the line feeding mode,

the second idle swing gear engages and transmits the driving force to the second drive roller gear, and

the second drive roller transmits the driving force to the first drive roller.

8. The paper-feeding apparatus according to claim 7, wherein the drive roller power transmitter comprises:

a one-way power transmitting part disposed coaxially with the first drive roller,

transmitting the driving force to the second drive roller through the first drive roller during the paper pickup mode, and

not transmitting the driving force to the pickup roller assembly during the line feeding mode, to allow the first drive roller to idle.

9. The paper-feeding apparatus according to claim 8, wherein the one-way power transmitting part comprises:

a spring clutch comprising

a roller hub of the first drive roller,

a bushing fixedly positioned coaxially with the first drive roller and having a bushing hub, and

a clutch spring coiled around the roller hub and the bushing hub to generate a sliding friction force therebetween,

wherein during the paper pickup mode,

the first drive roller gear transmits the driving force pickup roller assembly and the bushing via the first drive roller shaft, and

the clutch spring is coiled in a winding direction thereof, and engages the roller hub, thereby transmitting the driving force to the first drive roller, and

during the line feeding mode,

the second drive roller transmits the driving force to the first drive roller, thereby rotating the roller hub and uncoiling the clutch spring in an anti-winding direction thereof, and thereby not transmitting the driving force to any of the bushing, first drive roller shaft, and the pickup roller assembly.

10. The paper-feeding apparatus according to claim 8, wherein the one-way power transmitting part comprises a ratchet.

11. The paper-feeding apparatus according to claim 1, wherein the pickup roller assembly comprises:

a pickup driving gear disposed on the first drive roller shaft; and

at least one idle pickup gear disposed between the pickup driving gear and the pickup roller to transmit the driving power from the pickup driving gear to the pickup roller.

12. The paper-feeding apparatus according to claim 11, wherein the pickup roller assembly further comprises a pickup roller gear positioned coaxially with the pickup roller,

wherein the at least one idle pickup gear is disposed between the pickup driving gear and the pickup roller gear, and transmits the driving power from the pickup driving gear to the pickup roller gear.

13. The paper-feeding apparatus according to claim 1, further comprising a second drive roller releaser to separate the second drive roller from the first drive roller.

14. The paper-feeding apparatus according to claim 13, wherein the second drive roller releaser comprises:

a releasing lever, with a first end rotatably disposed on a frame, and a second end rotatably supporting the second drive roller shaft; and

a restoring part biasing the releasing lever such that the second drive roller contacts the first drive roller with a predetermined pressure.

15. The paper-feeding apparatus according to claim 14, wherein:

the releasing lever comprises a fixing projection; and

the restoring part comprises an elastic spring with ends, respectively supported on the fixing projection and the frame.

16. The paper-feeding apparatus according to claim 1, further comprising:

a pickup roller assembly lifter, selectively separating the pickup roller from the sheet of paper.

17. The paper-feeding apparatus according to claim 16, wherein:

during the paper pickup mode, the pickup contacts the sheet of paper.

18. The paper-feeding apparatus according to claim 17, wherein:

the pickup roller assembly comprises a supporting projection; and

the pickup roller assembly lifter comprises an elastic spring disposed on the first drive roller shaft, biasing the pickup roller assembly in a first rotational direction, and having ends supported respectively on a frame and the supporting projection.

19. The paper-feeding apparatus according to claim 17, wherein

the pickup roller assembly lifter separates the pickup roller from the sheet of paper when the paper cassette is detached from a frame, and brings the pickup roller into contact with the sheet of paper when the paper cassette is inserted into the frame.

20. The paper-feeding apparatus according to claim 19, wherein the pickup roller assembly lifter comprises:

a lift guiding groove portion positioned at a top end of a sidewall of the paper cassette;

a lifting shaft supported rotatably on the frame, and including a projecting guide at a first end thereof guided by the lift guiding groove portion, thereby rotating the lifting shaft;

a link member installed between a second end of the lifting shaft and the pickup roller assembly, to move the pickup roller between a descent position contacting the sheet of paper and an ascent position separated from the sheet of paper when the lifting shaft is rotated by the projecting guide; and

a pulling part to bias the pickup roller assembly in a first rotational direction toward the ascent position.

21. The paper-feeding apparatus according to claim 20, wherein the link member comprises:

a first link with a first end fixed at the second end of the lifting shaft; and

a second link with first and second ends, respectively, rotatably supported at a second end of the first link and the pickup roller assembly.

22. The paper-feeding apparatus according to claim 20, wherein the pulling part comprises:

an extension spring having a first end supported at one of the pickup roller assembly, and the second link, and a second end supported at the frame.

23. A paper-feeding apparatus of an image forming apparatus, comprising:

a first drive roller;

a pickup roller;

a second drive roller;

a swing gear part selectively transmitting a driving force to one of the first drive roller and the second drive roller, and

a one-way power transmitting part disposed coaxially with the first drive roller, transmitting the driving force to the pickup roller only when the first drive roller is rotated in a first rotational direction.